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EXAMINER

SHERMAN, STEPHEN G

ART UNIT PAPER NUMBER

2629

DATE MAILED: 06/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/620,455	Applicant(s) LEE, YU-TUAN	
	Examiner Stephen G. Sherman	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. This office action is in response to the amendment filed the 5 June 2006. Claims 1-28 are pending.

Response to Arguments

2. Applicant's arguments filed the 5 June 2006 have been fully considered but they are not persuasive.

On page 5 of the amendment, paragraphs 3-4 the applicant argues that Figure 6 of Nohno shows that the Y-coordinate detection period overlaps with the display period, therefore Nohno fails to teach of detecting the touch positions in-between writing periods. The examiner respectfully disagrees.

As shown in Figure 6 of Nohno, One Frame consists of a coordinate detection period and a display period, i.e. writing period. The **dotted lines extending from the coordinate detection period shows an enlargement of this period**, which contains the x-coordinate detection period and the y-coordinate detection period as contained in the coordinate detection cycle signal **which ends when the display period begins**. Therefore, the y-coordinate detection period and the display period **do not overlap**, meaning that Nohno does disclose "detects a scan-line-direction touch position according to the values of the liquid crystal capacitances formed between the scan lines needed to be detected and the counter electrode during idling time in-between writing

periods” as recited in claim 1 and detect the liquid crystal capacitances formed between the scan lines needed to be detected and the counter electrode during idling time in-between writing periods” as recited in claim 16.

On page 5 of the amendment, paragraph 5 the applicant argues that in the Nohno reference the X-coordinate detection period occurs before the Y-coordinate detection period, therefore Nohno fails to teach “charges a voltage signal into each of the data lines needed to be detected after the scan-line direction touch position is detected” as recited in claim 1 and “charges a voltage signal into each of the data lines needed to be detected after the scan-line-detection touch position detected” as recited in claim 16. The examiner respectfully disagrees.

As recited in the office action, the examiner interprets that the voltage charged into the data lines is the claimed voltage signal which is charged into each of the data lines. As shown in Figure 6, each frame consists of first a coordinate detection period and second a display period. The examiner interpreted that since in one frame the display period is after the coordinate detection period that the voltage signal is charged into the data lines after the scan line detection takes place, and furthermore in the next frame since coordinate detection would take place again, the data lines would be detected for touch, which would occur after the voltage signal is charged. There is not a limitation in the claim that prevents the examiner’s interpretation of the claimed “voltage signal.” Therefore Nohno discloses “charges a voltage signal into each of the data lines needed to be detected after the scan-line direction touch position is detected” as recited

in claim 1 and "charges a voltage signal into each of the data lines needed to be detected after the scan-line-detection touch position detected" as recited in claim 16.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-4, 7-16 and 19-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nohno et al. (US 6,239,788) in view of Ikeda (US 5,642,134).

Regarding claim 1, Nohno et al. disclose a touch-control method of an LCD, which is to sense a touch point on an LCD screen of the LCD (Figure 1, item 31), the

LCD comprising a substrate having a plurality of data lines (Figure 1, S1-SN) and a plurality of scan lines (Figure 1, G1-GM), the method comprising:

a first touch-position sensing step, which detects values of liquid crystal capacitances formed between the scan lines needed to be detected and a human finger (Figure 2), respectively, and

detects a scan-line-direction touch position according to values of the liquid crystal capacitances formed between the scan lines needed to be detected and a finger during idling time in-between writing periods (Column 13 lines 64 to column 14, line 10. The examiner interprets that since the y-coordinate detection voltage is taken, compared, and then the peak detection of the voltage is converted into a y-coordinate that there is a step which involves detecting the capacitance formed and that these values are then converted and then determines the position, or coordinate, of the value.),

each of the scan lines turning on sequentially to write image data into the LCD screen in the writing periods (Column 12, lines 42-49. The examiner interprets that the display period is the writing period and that the coordinate detection period is the idling time in-between writing periods.);

a charging step, which charges a voltage signal into each of the data lines needed to be detected (Column 12, lines 31-41. The examiner interprets that when writing occurs a voltage used for display is charged into the data lines, including the ones that are needed to be detected.); and

a second touch-position sensing step, which detects values of liquid crystal capacitances formed between the data lines needed to be detected and a finger (Figure 2), respectively, and

detects a data-line-direction touch position according to the values of the liquid crystal capacitances formed between the data lines needed to be detected and the finger (Column 13 lines 64 to column 14, line 10. The examiner interprets that since the x-coordinate detection voltage is taken, compared, and then the peak detection of the voltage is converted into an x-coordinate that there is a step which involves detecting the capacitance formed and that these values are then converted and then determines the position, or coordinate, of the value after the voltage signal is charged (The examiner interprets that since the rotation between writing and detecting periods occurs, that in one detection period the scan lines could be detected, then in a writing step a voltage is charged into the data lines in the charging step, then in the next detection period the data lines are detected, therefore detecting the data lines after the voltage is charged.), wherein, the scan-line-direction touch position and the data-line touch position indicate a position of the touch point (Column 14, lines 17-20).

Nohno et al. fails to teach of an LCD comprising a counter electrode panel that is used to detect the capacitance between the counter electrode and the scan/data lines respectively to determine a touch.

Ikeda discloses an LCD comprising a counter electrode panel that is used to detect the capacitance between the counter electrode and the scan/data lines respectively to determine a touch (Figure 2 and column 2, line 64 to column 3, line 5.

The examiner interprets that when an identifying scan pulse is sent to one of the supply lines 51 and 52, which are the gate and source lines, that the capacitive coupling is measured between the counter electrode 54 and one of the lines 51 or 52.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to integrate the counter electrode of Ikeda into the touch-display of Nohno et al. such that the capacitance would be measured between the counter electrode and each of the scan and data lines in order to alleviate the need for a tablet member which intervenes between a display and a finger which tends to cause a parallax so that the finger may be located at a position deviated from a position to be indicated on the display member.

Regarding claim 2, Nohno et al. and Ikeda disclose the method of claim 1.

Nohno et al. also disclose a method wherein when the scan-line-direction touch position is not detected in the first touch-position sensing step, the first touch-position sensing step is repeated (Figure 6. The examiner interprets that since the detection period is repeated ever frame, that if the touch position is not detected, the step would be repeated in the next frame.).

Regarding claim 3, Nohno et al. and Ikeda disclose the method of claim 1.

Nohno et al. also discloses a method wherein when the data-line-direction touch position is not detected in the second touch-position sensing step, the first touch-position sensing step is repeated (Figure 6. The examiner interprets that since the

detection period is repeated ever frame, that if the touch position is not detected, the step would be repeated in the next frame.).

Regarding claim 4, Nohno et al. and Ikeda disclose the method of claim 1.

Nohno et al. also disclose a method wherein the substrate is a TFT substrate (Column 12, lines 50-63).

Regarding claim 7, Nohno et al. and Ikeda disclose the method of claim 1.

Nohno et al. also disclose a method further comprising a comparing-value setting step, which sets at least one scan-line comparing value and at least one data-line comparing value (Column 13, line 64 to column 14, lines 10. The examiner interprets that since the x-coordinate detection voltage and the y-coordinate detection voltage are subjected to an approximation to a curve that this would be a comparing value for each of the x and y coordinates corresponding to the data and scan lines.).

Regarding claim 8, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. discloses a method wherein when a liquid crystal capacitance formed between one of the scan lines and a finger is greater than the scan-line comparing value, the first-touch position sensing step determines the location of the scan line corresponding to the liquid crystal capacitance is the scan-line-direction touch position (Column 13, line 64 to column 14, line 10. The examiner interprets that detecting the peak value by approximation to curves would determine that the value is

greater than the comparing value and that the counting the number of clocks to determine the coordinate value would determine the touch position.).

Regarding claim 9, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. also disclose a method wherein when a liquid crystal capacitance formed between one of the data lines and a finger is greater than the data-line comparing value, the second touch-position sensing step determines the location of the data line corresponding to the liquid crystal capacitance is the data-line-direction touch position (Column 13, line 64 to column 14, line 10. The examiner interprets that detecting the peak value by approximation to curves would determine that the value is greater than the comparing value and that the counting the number of clocks to determine the coordinate value would determine the touch position.).

Regarding claim 10, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. also discloses a method wherein the scan-line comparing value is equal to a predetermined value plus a minimum value of the liquid crystal capacitances formed between the data lines needed to be detected and the finger (Column 13, line 64 to column 14, line 10. The examiner interprets that the curves of which the values are approximated to would be the scan-line comparing value and that it would have been obvious to set the curves to be equal to a predetermined value plus a minimum value of the liquid crystal capacitances formed between the scan lines and the counter electrode because by adding in this minimum value the comparing value can take into account the

electrostatic coupling capacitance which exists between wiring lines and the electrode and thus a capacitance would only be detected when the LCD is touched.).

Regarding claim 11, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. also discloses a method wherein the data-line comparing value is equal to a predetermined value plus a minimum value of the liquid crystal capacitances formed between the data lines needed to be detected and the finger (Column 13, line 64 to column 14, line 10. The examiner interprets that the curves of which the values are approximated to would be the data-line comparing value and that it would have been obvious to set the curves to be equal to a predetermined value plus a minimum value of the liquid crystal capacitances formed between the data lines and the counter electrode because by adding in this minimum value the comparing value can take into account the electrostatic coupling capacitance which exists between wiring lines and the electrode and thus a capacitance would only be detected when the LCD is touched.).

Regarding claim 12, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. also discloses a method wherein the scan-line comparing value is equal to a predetermined value plus one of the values of the previously detected liquid crystal capacitances formed between the finger and the scan lines (Column 13, line 64 to column 14, line 10 and column 14, lines 27-31. The examiner interprets that the curves of which the values are approximated to would be the scan-line comparing value and that it would have been obvious to set the curves to be equal to a predetermined

value plus one of the values of the previously detected liquid crystal capacitances formed between the counter electrode panel and the scan lines because since the purpose is to find the scan line with the largest current flowing, or capacitance value, that it would be obvious to compare the capacitances of previously detected lines together to determine the largest value, i.e. where the LCD has been touched.).

Regarding claim 13, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. also disclose a method wherein the data-line comparing value is equal to a predetermined value plus one of the values of the previously detected liquid crystal capacitances formed between the finger and the data lines (Column 13, line 64 to column 14, line 10 and column 14, lines 27-31. The examiner interprets that the curves of which the values are approximated to would be the data-line comparing value and that it would have been obvious to set the curves to be equal to a predetermined value plus one of the values of the previously detected liquid crystal capacitances formed between the counter electrode panel and the data lines because since the purpose is to find the data line with the largest current flowing, or capacitance value, that it would be obvious to compare the capacitances of previously detected lines together to determine the largest value, i.e. where the LCD has been touched.).

Regarding claim 14, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. also disclose a method wherein the scan-line comparing value is equal to a predetermined value plus an average of at least two values of the liquid

crystal capacitances formed between the scan lines needed to be detected and the finger (Column 13, line 64 to column 14, line 10 and column 14, lines 27-31. The examiner interprets that the curves of which the values are approximated to would be the scan-line comparing value and that it would have been obvious to set the curves to be equal to a predetermined value plus an average of at least two values of the liquid crystal capacitances formed between the scan lines and the counter electrode because the purpose of the invention is to find the scan line with the largest current, or capacitance, and by taking an average value of at least two values of capacitances formed there would be less error in the detection of the position touched.).

Regarding claim 15, Nohno et al. and Ikeda disclose the method of claim 7.

Nohno et al. also disclose a method wherein the data-line comparing value is equal to a predetermined value plus an average of at least two values of the liquid crystal capacitances formed between the data lines needed to be detected and the finger (Column 13, line 64 to column 14, line 10 and column 14, lines 27-31. The examiner interprets that the curves of which the values are approximated to would be the data-line comparing value and that it would have been obvious to set the curves to be equal to a predetermined value plus an average of at least two values of the liquid crystal capacitances formed between the data lines and the counter electrode because the purpose of the invention is to find the data line with the largest current, or capacitance, and by taking an average value of at least two values of capacitances formed there would be less error in the detection of the position touched.).

Regarding claim 16, Nohno et al. disclose an LCD (liquid crystal display) (Figure 1, item 31), which has a substrate having a plurality of data lines (Figure 1, S1-SN) and a plurality of scan lines (Figure 1, G1-GM), comprising:

a first sensing circuit (Figure 1, item 36), which respectively electrically connects to the scan lines needed to be detected, detects values of liquid crystal capacitances formed between the scan lines needed to be detected and a finger, and detects a scan-line-direction touch position according to the values of the liquid crystal capacitances formed between the scan lines needed to be detected and the finger (Column 13 lines 64 to column 14, line 10. The examiner interprets that since the y-coordinate detection voltage is taken, compared, and then the peak detection of the voltage is converted into a y-coordinate that the coordinate detection circuit detects the capacitance formed, in the form of current, and that these values are then converted and the position, or coordinate, of the value determined.);

a timing control circuit (Figure 1, item 39), which electrically connects to the first sensing circuit and controls the first sensing circuit to detect the liquid crystal capacitances formed between the scan lines needed to be detected and the finger during idling time in-between writing periods (Column 12 lines 31-41. The examiner interprets since the timing signal is sent to execute a coordinate detection period that it would control the detection circuit as well.),

each of the scan lines turning on sequentially to write image data into the LCD screen in the writing periods (Column 12, lines 42-49. The examiner interprets that

since the drive circuits are controlled during a display period that it is well known in the art to turn the scanning lines sequentially to accomplish this.);

a voltage-signal generating circuit (Figure 1, items 37 and 38), which electrically connects to the timing control circuit and each of the data lines, wherein the timing control circuit controls the voltage-signal generating circuit to charge a voltage signal into each of the data lines needed to be detected after the scan-line-direction touch position is detected (Figure 1 and column 12, lines 16-30. The examiner interprets that the DC power supply circuit 37 and the AC applying circuit combine to form the voltage-signal generating circuit. The AC applying circuit is controlled by the control circuit to charge the voltage signal, the charging being explained in claim 1.); and

a second sensing circuit (Figure 1, item 36), which respectively electrically connects to each of the data lines needed to be detected, detects values of liquid crystal capacitances formed between the data lines needed to be detected and the finger, and detects a data-line-direction touch position according to the values of the liquid crystal capacitances formed between the data lines needed to be detected and the finger after the voltage signal is charged (Column 13 lines 64 to column 14, line 10. The examiner interprets that since the x-coordinate detection voltage is taken, compared, and then the peak detection of the voltage is converted into an x-coordinate that the coordinate detection circuit detects the capacitance formed, in the form of current, and that these values are then converted and the position, or coordinate, of the value determined after the voltage signal is charged as described in claim 1.).

Nohno et al. fails to teach of an LCD comprising a counter electrode panel that is used to detect the capacitance between the counter electrode and the scan/data lines respectively to determine a touch.

Ikeda discloses an LCD comprising a counter electrode panel that is used to detect the capacitance between the counter electrode and the scan/data lines respectively to determine a touch (Figure 2 and column 2, line 64 to column 3, line 5. The examiner interprets that when an identifying scan pulse is sent to one of the supply lines 51 and 52, which are the gate and source lines, that the capacitive coupling is measured between the counter electrode 54 and one of the lines 51 or 52.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to integrate the counter electrode of Ikeda into the touch-display of Nohno et al. such that the capacitance would be measured between the counter electrode and each of the scan and data lines in order to alleviate the need for a tablet member which intervenes between a display and a finger which tends to cause a parallax so that the finger may be located at a position deviated from a position to be indicated on the display member.

Regarding claim 19, this claim is rejected under the same rationale as claim 4.

Regarding claim 20, Nohno et al. and Ikeda disclose the LCD of claim 16.

Nohno et al. also disclose an LCD further comprising: a comparing-value setting circuit (Figure 1, item 36. The examiner interprets that item 36 also constitutes as a

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comparing-value setting circuit.), which respectively electrically connects to the first sensing circuit and the second sensing circuit, and sets at least one scan-line comparing value to be input to the first sensing circuit and at least one data-line comparing value to be input to the second sensing circuit (Figure 1, item 36 and column 13, line 64 to column 14, line 10. The examiner interprets that since the coordinate detection circuit approximates the voltages for the scan and data values to curves that these curves, or comparing values, have to be generated and would be formed by the coordinate detection circuit therefore making it a comparing-value setting circuit.).

Regarding claim 21, this claim is rejected under the same rationale as claim 8.

Regarding claim 22, this claim is rejected under the same rationale as claim 9.

Regarding claim 23, this claim is rejected under the same rationale as claim 10.

Regarding claim 24, this claim is rejected under the same rationale as claim 11.

Regarding claim 25, this claim is rejected under the same rationale as claim 12.

Regarding claim 26, this claim is rejected under the same rationale as claim 13.

Regarding claim 27, this claim is rejected under the same rationale as claim 14.

Regarding claim 28, this claim is rejected under the same rationale as claim 15.

6. Claims 5-6 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nohno et al. (US 6,239,788) in view of Ikeda (US 5,642,134) and further in view of Knapp (US 5,270,711)

Regarding claims 5 and 6, Nohno et al. and Ikeda disclose the method of claim 1.

Nohno et al. and Ikeda fail to teach a method wherein when detecting the liquid crystal capacitances formed between the scan/data lines and the counter electrode panel, at least one of the scan/data lines is skipped in the first/second touch-position sensing step.

Knapp discloses a method wherein when detecting the touching of the panel, at least one of the array elements is skipped (Column 2, lines 3-19. The examiner interprets that since the elements of those whose states are indicative of having been touched and their locations being ascertained means that the elements that have not been touched would therefore not be sensed and in a sense would be "skipped.").

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use the method of skipping some of the scanning lines as taught by Knapp with the method taught by the combination of Nohno et al. and Ikeda in order to provide a touch sensor array capable of high resolution.

Regarding claim 17, this claim is rejected under the same rationale as claim 5.

Regarding claim 18, this claim is rejected under the same rationale as claim 6.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen G. Sherman whose telephone number is (571) 272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SS

14 June 2006



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TECHNOLOGY CENTER 2600